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Quality of Care and Outcomes Assessment

HEALTH-ECONOMIC BENEFITS OF LOW-DENSITY LIPOPROTEIN CHOLESTEROL LOWERING IN HIGH RISK PATIENTS: A DISCRETE-EVENT SIMULATION MODEL

ACC Moderated Poster Contributions
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Background: Low-density lipoprotein cholesterol (LDL-C) is a key target for therapy to reduce the risk of cardiovascular (CV) events. The relationship between LDL-C and the risk of individual CV events was quantified in a 2010 meta-analysis of 26 randomized trials (170,000 patients). This study estimated the health-economic benefits of incremental LDL-C lowering in high-risk patients with coronary heart disease using baseline LDL-C data from National Health and Nutrition Examination Survey (NHANES) and the meta-analysis LDL-C/event risk relationship for this population.

Methods: A discrete-event simulation model was developed with a hypothetical cohort of 100,000 patients initiating LDL-C-lowering treatment. Initial age and pre-treatment LDL-C level distributions were based on NHANES data. The meta-analysis LDL-C/event risk relationship was applied to estimate risks for 7 distinct CV events and non-CV death from patients' post-treatment LDL-C levels. Time-to-events were probabilistically generated for each risk level from survival models. Patients probabilistically transitioned to subsequent events until death. Event costs and utilities were based on published sources. The model simulated cost consequences exclusive of incremental LDL-C-lowering treatment costs. Costs and quality-adjusted life-years (QALYs) were discounted 3% annually. A willingness-to-pay of $50,000/QALY was assumed.

Results: Incremental LDL-C reduction of 50% produced 0.53 fewer CV events, $19,500 lower CV-event costs, 0.8 incremental life-years, 0.7 incremental QALYs, and $36,600 incremental monetized QALYs per patient over remaining lifetime. This resulted in $53,200 net benefit per patient over remaining lifetime, reflecting CV event cost reductions, incremental monetized QALYs, and incremental costs of increased survival.

Conclusions: Incremental LDL-C lowering may be associated with lower patient costs and higher QALYs over remaining lifetime. Further LDL-C lowering through maximized use of available therapies or novel treatments may result in health-economic benefits in high-risk patients, depending on treatment costs and assuming continued benefit accrual at lower LDL-C levels.